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Method for producing printed surfaces

The invention relates to a method for producing printed surfaces according to the preamble of claim 1.

It is known to use fluorescent dyestuffs in combination with normal dyestuffs for various effects.

Fluorescent dyestuffs are mixed with normal dyestuffs in order to make the colour brighter in daylight. The dyestuffs which are non-visible or fluoresce under ultraviolet light (UV light) are also especially used in the theatre for special effects, their dramatically fluorescent properties under UV illumination being exploited.

It is known that for use in signs and in advertising, adhesive, fluorescent foils are cut into letters and/or figures, emblems, logogrammes and the like which for example are stuck to a window pane or to a corresponding pane or panel made of glass, Plexiglas or a similar translucent material which consequently forms a carrier for signs or advertising.

In order to impart the desired, glowing, neon-like effect to the sign or advertisement, it must be illuminated by means of a so-called non-visible or black light.

An adhesive, fluorescent foil with a translucent layer, which is impermeable or substantially impermeable for UV radiation, is disclosed in WO-A-93/01581.

A disadvantage in the use of such adhesive, fluorescent foils in the form of cut-to-size letters, figures, emblems, logogrammes and the like in signs or in advertising resides in the fact that merely letter features, logos and uniform colour areas can be highlighted, in that photographic reproductions and pictures in general cannot however be depicted in

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colour gradations and transitions. Furthermore, it is disadvantageous that numerous foil characters (patterns) must be fabricated and cut in complex individual steps and the individual, monochrome foil patterns must be positioned and glued by hand within the scope of the actual formation of the sign or advertising surface.

A method is known from US-A-4 652 464 for printing art or advertising graphics using visible and/or non-visible, fluorescent dyestuffs and non-fluorescent dyestuffs in multiple print series of colours, each print series being implemented with one predetermined print pattern. Art and advertising graphics are thereby produced in the printing process with the property of depicting an object with a smooth transition under distinctly different lighting conditions when the object is observed under illuminations which vary between daylight or incandescent light up to UV light.

In this method visible and/or non-visible, fluorescent dyestuffs are used during the printing process, which are applied to the previously selected areas of the picture in a predetermined pattern in order to obtain the desired colours under normal light or daylight and in order to amalgamate these fluorescent dyestuffs with the non-fluorescent dyestuffs under UV light, so that the fluorescent dyestuffs are blended or concealed under normal light.

The relative ratio and the colours and different colour tones of the non-fluorescent dyestuffs and of the visible and non-visible, fluorescent dyestuffs are hereby selected in advance, in order to achieve a gradual, fine transition on the picture when it is observed under light conditions which alternate between daylight and UV light or in order to blend or shade the effect or in order to reduce the intensity of the fluorescent dyestuffs in specific areas so as to achieve a more natural and gentler effect under UV light.

The disadvantage of the method according to US-A-4 652 464 resides in the fact that the printing process must be modified in a complex manner in order to include the application in addition of fluorescent dyestuffs, and that a printing process is required which is structured in many printing steps with the application of a multiplicity of specific fluorescent dyestuffs and, furthermore, predetermined areas with gradations both of the normal colours and also of the non-visible, fluorescent dyestuffs must be printed, in order thus to examine the desired effect of not impairing the fluorescent dyestuffs, which are applied to the picture, by the normal daylight dyestuff patterns.

Finally, a method for producing surfaces which are luminous at night is known from DE-A1-196 20 090, in which a wire printer method with luminous colours red, green, blue is used so that the printed surface is luminous at night. In a second print run with translucent colours the motif depicted on the printed surface can also be made visible in daytime. The second print run thereby serves at the same time as UV and reaction protection of the luminous colours.

The object underlying the present invention is to avoid the hitherto required multiplicity of printing steps and in particular the complex adjustment of the fluorescent colours in the printing process.

This object is achieved by means of the features mentioned in claim 1.

Particular requirements or additional steps are hence no longer required. Hitherto, non-visible, fluorescent dyestuffs were not used in the mentioned form in the four- and multi-colour printing method. The advantages of the invention reside particularly in the fact that, instead of a multiplicity of printing steps using non-visible, fluorescent print colours and paints, the normal practice printing steps are implemented and, in this connection as also with four- and multi-colour printing with the conventional primary colours, in the lithographic composition an

authentic pictorial reproduction is effected by means of targeted alteration of the colour parameters of each individual print colour and in the printing itself a fine adaptation of the perceived colour is effected by means of an alteration of the applied colour quantity. This alteration method which is known to any printer can immediately be implemented without special training or other know-how in a non-problematic manner.

Further expedient and advantageous embodiments of the invention emerge from the sub-claims.

An expedient development of the invention provides that there are added to the print colours and/or paints organic pigments in the range of 15% to 20%, fluorescent pigments in the range of 5% to 30% and optically active substances in the range of 0% in one kilogram of colour. By means of these measures, a very weak luminosity of the colours is achieved.

By means of the measures of claim 3, a weak luminosity of the colours can be achieved, whilst by means of the measures of claim 4, an average luminosity of the colours can be achieved. By means of the measures of claim 5, a strong luminosity of the colours is achieved and finally a very strong luminosity of the colours is achieved by means of the measures of claim 6.

The invention also extends to a single colour printing method. In the case of print colours it relates to highly colourfast print colours. Special colour tones can likewise be taken into account.

By printing with fluorescent colours, it is achieved that the printed reproduction corresponds to the model in its colourfastness and colour gradation in daylight and appears as a completely normal poster or advertising surface, though with the effect that by using the fluorescent dyestuffs even in daylight greater luminosity of the colours is already

expressed, so that the reproduction strikes the observer substantially sooner than a conventional four colour print poster.

As the most distinctive advantage, it emerges that the picture which is printed with fluorescent colours, the advertising graphics, advertising surface or the like, glows entirely of its own accord at night under UV light with an authentic colour reproduction in comparison with the daylight effect, comparable to the brilliance of a television picture, though even more effectively in all colour gradations such that three dimensional effects are produced in the reproduction with the luminosity of a slide projection and a deep three-dimensional effect is achieved, so that it is achieved that the observer pays particular attention. Furthermore, the picture surface which is applied to a dark background glows of its own accord at night under UV illumination, since the UV light source, contrary to white light, throws no scattered light.

The printing process according to the present invention comprises conventional methods and materials, the invention constituting in particular the combination of the function of the elements.

The ratio of a percentage mixture of fluorescent pigments and non-fluorescent pigments varies on the one hand according to the individual colours or colour tones, the different print stocks and, on the other hand, according to the printing methods used, for example the offset or the screen print method. The print colours can be described as follows: conventional primary colours and special colour tones in combination with organic pigments, fluorescent pigments, and optically active substances, the mixture of organic pigments, fluorescent pigments and optically active substances being effected in different percentage ratios according to the printing method, according to primary colours and special tones and according to print stocks.

A preferred standard value for the ratio is given according to one embodiment of the invention in that the pigment addition to one kilogram of colour in the case of organic pigments is in the range of 0.5% to 5%, in the case of fluorescent pigments in the range of 15% to 80% and in the case of optically active substances in the range of 0.5% to 1%.

The invention is described in greater detail by means of the following example.

Possibly a photographically reproduced western city silhouette is to be printed, the back of a person being supposed to be reproduced in the foreground.

This motif is produced in the four colour printing method by using non-visible, fluorescent print colours and paints, the colour gradation being achieved, in the printing process step of the lithographic composition, as also in the case of the conventional four colour printing method, corresponding to the model by means of alteration of the colour parameters and a fine adaptation of the perceived colour being effected in the print itself by means of a corresponding increase or decrease of the colour quantity applied in the printing. The adjustment occurs taking into account the use of fluorescent dyestuffs, which do not correspond to the Euroscale norm, preferably by eye.

The advertising surfaces which fluoresce by means of the proposed method can be produced for any purpose, also therefore for packagings which are used with UV illumination in the gastronomic sphere.